

- 1 What is claimed is:
- 2 1. A chip-on-film package for image sensor comprising:
- 3 a chip-on-film (COF) film including an electrically insulating layer and a plurality of
- 4 metal traces, the insulating layer having an upper surface, a lower surface and at least
- 5 an opening, each metal trace having a connect pad, the connect pads being disposed
- 6 around the opening on the upper surface;
- 7 an image sensing chip being mounted on the upper surface of the COF film, the
- 8 image sensing chip having an active surface, the active surface includes an image
- 9 sensing region being aligned with the opening, the image sensing chip having a
- 10 plurality of flip-chip bumps at perimeter of the active surface, the flip-chip bumps
- 11 being electrically connected with the connect pads; and
- 12 a transparent glass bonded to the lower surface of the COF film corresponding to the
- 13 opening so as to form a hermetic gap between the transparent glass and the image
- 14 sensing chip.
- 15 2. The package in accordance with claim 1, wherein the opening is larger than the image
- 16 sensing region of the image sensing chip but smaller than the active surface.
- 17 3. The package in accordance with claim 2, further comprising a filling material formed
- 18 on the upper surface of the COF film to fill around the opening, thereby to seal the
- 19 gap.
- 20 4. The package in accordance with claim 3, wherein the filling material is an anisotropic
- 21 conductive paste (ACP) or non-conductive paste (NCP).
- 22 5. The package in accordance with claim 3, wherein the filling material is an anisotropic
- 23 conductive film (ACF) or non-conductive film (NCF).
- 24 6. The package in accordance with claim 3, wherein the filling material is a thermosetting
- 25 adhesive or UV adhesive formed by dispensing.
- 26 7. The package in accordance with claim 1, wherein the metal traces are formed on the
- 27 upper surface of the electrically insulating layer.

- 1 8. The package in accordance with claim 1, wherein a metal layer is formed over the
2 connect pads.
- 3 9. A method for making a chip-on-film package for image sensor comprising the steps of:
4 providing a chip-on-film (COF) film including an electrically insulating layer and a
5 plurality of metal traces, the insulating layer having an upper surface, a lower surface
6 and at least an opening, each metal trace having a connect pad, the connect pads
7 being disposed around the opening on the upper surface;
8 mounting an image sensing chip on the upper surface of the COF film, the image
9 sensing chip having an active surface, the active surface includes an image sensing
10 region being aligned with the opening, the image sensing chip having a plurality of
11 flip-chip bumps at perimeter of the active surface, the flip-chip bumps being
12 electrically connected with the connect pads; and
13 bonding a transparent glass to the lower surface of the COF film corresponding to the
14 opening so as to form a hermetic gap between the transparent glass and the image
15 sensing chip.
- 16 10. The method in accordance with claim 9, wherein the opening is larger than the
17 image sensing region of the image sensing chip but smaller than the active surface.
- 18 11. The method in accordance with claim 10, further comprising: the step of forming a
19 filling material on the upper surface of the COF film to fill around the opening,
20 thereby to seal the gap.
- 21 12. The method in accordance with claim 11, wherein the filling material is an
22 anisotropic conductive paste (ACP) or non-conductive paste (NCP).
- 23 13. The method in accordance with claim 11, wherein the filling material is an
24 anisotropic conductive film (ACF) or non-conductive film (NCF).
- 25 14. The method in accordance with claim 11, wherein the filling material is a
26 thermosetting adhesive or UV adhesive formed by dispensing.
- 27 15. The method in accordance with claim 9, wherein the metal traces are formed on the

1 upper surface of the electrically insulating layer.

2 16. The method in accordance with claim 9, wherein a metal layer is formed over the
3 connect pads.

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